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CONSULTING ASSESSMENT ENVIRONMENT

BACKGROUND OF THE INVENTION

5   **1.   Technical Field:**

The present invention relates to an improved data processing system. In particular, the present invention relates to a method, apparatus, and computer instructions for providing a consulting assessment environment.

10

2.   Description of Related Art:

Consulting activities for business assessments are typically very time consuming, at least in part because they are largely discovery based. A discovery based

15   approach for conducting assessments uses consulting subject matter experts who are specialists in working with a client to understand their business and identify how they can improve it. A prescriptive based approach uses consultants who are experts in best practices and

20   through their experience and knowledge, identify the problems in a business and know the solutions to fix them. The market is now looking at prescriptive approaches based upon best practices. Many of the steps in the activities for consulting assessments are manual,

25   which makes standardization of the consulting process difficult.

In addition, data preparations, such as translating hypotheses into interview questionnaires, conducting interviews, and summarizing interview data, are very

30   labor-intensive and lengthy in duration. Many

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assessments produce results that summarize the current
business state rather than analyzing the data to provide
new business insights and recommendations. The lack of
standardization results in inconsistent data, which
5   complicates the process of data consolidation (i.e.,
combining data from various divisions or units in a
business for the purpose of summarizing a larger
partition of the business).

      Tracking results and recommendations is difficult.
10 Many clients are reluctant to engage consultants for
assessment projects because of uncertainties regarding
the deliverables as well as costs of follow-up
assessments to monitor progress. For example, clients
will typically engage consultants the first time to
15 perform an assessment, but usually do not want to engage
the consultants again for follow-up assessments. Clients
often prefer to learn from the assessment process and
then have the option of performing the assessment
themselves.
20   Therefore, there is a need for a software tool to
standardize and simplify the business assessment process.

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SUMMARY OF THE INVENTION

The present invention provides a method, apparatus, and computer program product for providing a consulting
5 assessment environment. Consultants may use the environment to define templates that encode questionnaires and domain knowledge regarding business practices, as well as reporting criteria to specify the content and format of the assessment results.
10 Consultants or their clients may use the environment to automate the process of performing assessments and generating reports from those assessments. These assessments may analyze the current state of the business, compare the business's current state with
15 desired states or with best practices, and perform risk/benefit and/or cost/benefit analyses, according to the specifications made in the templates. An information hiding feature is provided to allow sensitive domain knowledge encoded within the templates, such as trade
20 secrets, to be made inaccessible to clients.

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BRIEF DESCRIPTION OF THE DRAWINGS

The novel features believed characteristic of the
invention are set forth in the appended claims. The
5 invention itself, however, as well as a preferred mode of
use, further objectives and advantages thereof, will best
be understood by reference to the following detailed
description of an illustrative embodiment when read in
conjunction with the accompanying drawings, wherein:

10 **Figure 1** depicts a pictorial representation of a
network of data processing systems in which the present
invention may be implemented;

Figure 2 depicts a block diagram of a data processing
system that may be implemented as a server in accordance
15 with a preferred embodiment of the present invention;

Figure 3 illustrates a block diagram of a data
processing system in which the present invention may be
implemented;

Figure 4 is a use case diagram illustrating a
20 consulting assessment environment in accordance with a
preferred embodiment of the present invention;

Figure 5 is an annotated class diagram of a
consulting assessment environment tool kit in accordance
with a preferred embodiment of the present invention; and

25 **Figure 6** is a block diagram of a consulting
assessment environment tool kit in accordance with an
alternative embodiment of the present invention employing
databases.

DETAILED DESCRIPTION OF THE PREFERRED EMBODIMENT

With reference now to the figures, **Figure 1** depicts a
pictorial representation of a network of data processing
5   systems in which the present invention may be implemented.
Network data processing system **100** is a network of
computers in which the present invention may be
implemented. Network data processing system **100** contains
a network **102**, which is the medium used to provide
10   communications links between various devices and computers
connected together within network data processing system
100. Network **102** may include connections, such as wire,
wireless communication links, or fiber optic cables.

In the depicted example, server **104** is connected to
15   network **102** along with storage unit **106**. In addition,
clients **108**, **110**, and **112** are connected to network **102**.
These clients **108**, **110**, and **112** may be, for example,
personal computers or network computers. In the depicted
example, server **104** provides data, such as boot files,
20   operating system images, and applications to clients **108**-
112. Clients **108**, **110**, and **112** are clients to server **104**.
Network data processing system **100** may include additional
servers, clients, and other devices not shown. In the
depicted example, network data processing system **100** is
25   the Internet with network **102** representing a worldwide
collection of networks and gateways that use the
Transmission Control Protocol/Internet Protocol (TCP/IP)
suite of protocols to communicate with one another. At
the heart of the Internet is a backbone of high-speed data
30   communication lines between major nodes or host computers,

consisting of thousands of commercial, government, educational and other computer systems that route data and messages. Of course, network data processing system **100** also may be implemented as a number of different types of

5   networks, such as for example, an intranet, a local area network (LAN), or a wide area network (WAN). **Figure 1** is intended as an example, and not as an architectural limitation for the present invention.

Referring to **Figure 2**, a block diagram of a data

10   processing system that may be implemented as a server, such as server **104** in **Figure 1**, is depicted in accordance with a preferred embodiment of the present invention. Data processing system **200** may be a symmetric multiprocessor (SMP) system including a plurality of

15   processors **202** and **204** connected to system bus **206**. Alternatively, a single processor system may be employed. Also connected to system bus **206** is memory controller/cache **208**, which provides an interface to local memory **209**. I/O bus bridge **210** is connected to system bus

20   **206** and provides an interface to I/O bus **212**. Memory controller/cache **208** and I/O bus bridge **210** may be integrated as depicted.

Peripheral component interconnect (PCI) bus bridge **214** connected to I/O bus **212** provides an interface to PCI

25   local bus **216**. A number of modems may be connected to PCI local bus **216**. Typical PCI bus implementations will support four PCI expansion slots or add-in connectors. Communications links to clients **108-112** in **Figure 1** may be provided through modem **218** and network adapter **220**

30   connected to PCI local bus **216** through add-in boards.

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Additional PCI bus bridges **222** and **224** provide
interfaces for additional PCI local buses **226** and **228**,
from which additional modems or network adapters may be
supported. In this manner, data processing system **200**

5   allows connections to multiple network computers. A
memory-mapped graphics adapter **230** and hard disk **232** may
also be connected to I/O bus **212** as depicted, either
directly or indirectly.

Those of ordinary skill in the art will appreciate

10   that the hardware depicted in **Figure 2** may vary. For
example, other peripheral devices, such as optical disk
drives and the like, also may be used in addition to or in
place of the hardware depicted. The depicted example is
not meant to imply architectural limitations with respect

15   to the present invention.

The data processing system depicted in **Figure 2** may
be, for example, an IBM eServer pSeries system, a product
of International Business Machines Corporation in Armonk,
New York, running the Advanced Interactive Executive

20   (AIX) operating system or LINUX operating system.

With reference now to **Figure 3**, a block diagram
illustrating a data processing system is depicted in which
the present invention may be implemented. Data processing
system **300** is an example of a client computer. Data

25   processing system **300** employs a peripheral component
interconnect (PCI) local bus architecture. Although the
depicted example employs a PCI bus, other bus
architectures such as Accelerated Graphics Port (AGP) and
Industry Standard Architecture (ISA) may be used.

30   Processor **302** and main memory **304** are connected to PCI

local bus **306** through PCI bridge **308**. PCI bridge **308** also may include an integrated memory controller and cache memory for processor **302**. Additional connections to PCI local bus **306** may be made through direct component

5 interconnection or through add-in boards. In the depicted example, local area network (LAN) adapter **310**, SCSI host bus adapter **312**, and expansion bus interface **314** are connected to PCI local bus **306** by direct component connection. In contrast, audio adapter **316**, graphics

10 adapter **318**, and audio/video adapter **319** are connected to PCI local bus **306** by add-in boards inserted into expansion slots. Expansion bus interface **314** provides a connection for a keyboard and mouse adapter **320**, modem **322**, and additional memory **324**. Small computer system interface

15 (SCSI) host bus adapter **312** provides a connection for hard disk drive **326**, tape drive **328**, and CD-ROM drive **330**. Typical PCI local bus implementations will support three or four PCI expansion slots or add-in connectors.

An operating system runs on processor **302** and is used

20 to coordinate and provide control of various components within data processing system **300** in **Figure 3**. The operating system may be a commercially available operating system, such as Windows XP, which is available from Microsoft Corporation. An object oriented programming

25 system such as Java may run in conjunction with the operating system and provide calls to the operating system from Java programs or applications executing on data processing system **300**. "Java" is a trademark of Sun Microsystems, Inc. Instructions for the operating system,

30 the object-oriented operating system, and applications or

programs are located on storage devices, such as hard disk drive **326**, and may be loaded into main memory **304** for execution by processor **302**.

5   Those of ordinary skill in the art will appreciate that the hardware in **Figure 3** may vary depending on the implementation. Other internal hardware or peripheral devices, such as flash read-only memory (ROM), equivalent nonvolatile memory, or optical disk drives and the like, may be used in addition to or in place of the hardware

10 depicted in **Figure 3**. Also, the processes of the present invention may be applied to a multiprocessor data processing system.

As another example, data processing system **300** may be a stand-alone system configured to be bootable without

15 relying on some type of network communication interfaces. In a further example, data processing system **300** may be a personal digital assistant (PDA) device, which is configured with ROM and/or flash ROM in order to provide non-volatile memory for storing operating system files

20 and/or user-generated data.

The depicted example in **Figure 3** and above-described examples are not meant to imply architectural limitations. For example, data processing system **300** also may be a notebook computer or hand held computer in

25 addition to taking the form of a PDA. Data processing system **300** also may be a kiosk or a Web appliance.

The present invention provides a method, apparatus, and computer program product for providing a consulting assessment environment. Consultants may use the

30 environment to define templates that encode

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questionnaires and domain knowledge regarding business practices, as well as reporting criteria to specify the content and format of the assessment results. Consultants or their clients may use the environment to

5   automate the process of performing assessments and generating reports from those assessments.

Another important benefit of the present invention is the separation of the assessment data from the assessment business logic, which provides a framework for

10   repeatability, reuse, and flexibility and allowing assessment data to be changed easily without having to modify the assessment business logic. This eliminates the need to build a new assessment tool for multiple types of assessments. Another significant advantage

15   provided by a preferred embodiment of the present invention is an information hiding feature to allow sensitive domain knowledge encoded within the templates, such as trade secrets, to be made inaccessible to clients.

20   **Figure 4** is a use case diagram illustrating a consulting assessment environment in accordance with a preferred embodiment of the present invention. Use cases (e.g., use case **402**) are scenarios in which an actor (such as consultant **400** or client **412**) uses a system (in this

25   case, a software system) to perform one or more tasks.

Turning now to **Figure 4,** consultant **400** uses the consulting assessment environment to define templates (define templates use case **402**) for a consulting assessment environment. Templates are files or data

30   structures that encode information that forms the basis

for conducting an assessment. Templates may include, but are not limited to, questionnaires and/or forms for acquiring information to be used in the assessment, formula and/or logic rule definitions to define how

5 acquired data is used to generate assessment results, definitions of suggested actions to be taken in response to various assessment results, and report forms and formats for specifying how the results of an assessment are to be presented in a human-readable form.

10 In a preferred embodiment, templates are workbook pages in a spreadsheet program that supports workbooks, such as MICROSOFT EXCEL. In an alternate embodiment using a programming language, such as Java, templates are data tables. Input forms, report forms, formulas, and logic

15 rules may all be programmed into cells or groups of cells in spreadsheet workbook pages. As data is input into a questionnaire or input form of the workbook, the data is used to derive contents for all other cells that depend on that data. One of ordinary skill in the art will also

20 appreciate that some spreadsheet programs, including MICROSOFT EXCEL, allow workbook pages to be hidden or made inaccessible to the ordinary user; this or another similar feature may be used to protect proprietary information encoded in one or more templates. In an alternative

25 embodiment, the templates may be encoded into components of a database application in a database management system such as DB2 (an IBM database product).

Returning now to the diagram, define templates use case **402** is a generalization of a number of more specific

30 template-definition use cases, including define

questionnaires use case **404**, define assessment formulas and rules use case **406**, define goals use case **407**, define suggested actions use case **408**, and define reporting criteria use case **410**. In define questionnaires use case

5   **404,** consultant **400** uses the consulting assessment environment for creating and collecting hypotheses and translating the hypotheses into questions to assess the current state of a business. The questions are input into data worksheets or data structures. In define assessment

10   formulas and rules use case **406,** consultant **400** creates calculations, formulas, logic, and rules for the framework of the assessment that leverages best practices and business consultant expertise. In define goals use case **407,** consultant **400** defines the information for a desired

15   state of a business, to encode knowledge of best practices or other business domain knowledge. In define suggested actions use case **408,** consultant **400** defines actions to achieve a desired state of a business. Finally, in define reporting criteria use case **410,** consultant **400** specifies

20   the content and format for the data in report templates.

A client of consultant **400**, such as client **412,** may also use the consulting assessment environment to perform additional tasks associated with performing an assessment of a business. One of ordinary skill in the art will

25   recognize that consultant **400** may also use the consulting assessment environment to perform these tasks. The number and type of templates may vary in alternate embodiments of the present invention.

Returning now to the diagram, in acquire information

30   use case **414,** client **412** uses the consulting assessment

environment to acquire information about the business, via questionnaires defined in define questionnaires use case **404**, for example, as represented by answer questionnaires use case **416**.

5   In perform assessment use case **418**, client **412** uses the consulting assessment environment to perform an assessment using templates (such as formulas and rules templates, suggested actions templates, and goals templates) defined by consultant **400**. In a preferred

10   embodiment, many of these analysis-related templates are hidden or otherwise made inaccessible to client **412**. This allows client **412** to perform an assessment without revealing valuable information (e.g., trade secrets) about how the assessment is carried out.

15   Perform assessment use case **418** is a generalization of more specific use cases, and a complete assessment may include more than one of these more specific use cases. Some more specific use cases for performing assessments include, but are not limited to, applying formulas (use

20   case **420**), assessing gaps between the current state of the business and goals for a desired state (use case **422**), determining suggested actions to be taken in furtherance of those goals (use case **424**), and calculating costs and benefits (use case **425**). Calculating costs and benefits

25   use case **425** is a generalization of more specific use cases. Specifically, potential business risks and benefits of the business's current state may be determined (use case **427**), and risks and benefits of taking action to move to some desired state may also be determined (use

30   case **429**).

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Client **412** may also generate reports (use case **426**)
using templates defined by consultant **400**. Specific
report generation use cases include generating charts (use
case **428**), summarizing (e.g., in a text document)
5   assessment results (use case **430**), and consolidating the
results from divisions or units of the business to create
a more general assessment of a larger business unit or the
business as a whole (use case **432**).

The depicted example in **Figure 4** and above-described
10   examples are not meant to imply limitations. There are
multiple ways in which an embodiment of the present
invention may be implemented, such as for example: (a) as
a desktop application (such as MICROSOFT EXCEL), where the
data template is prepared, and then data collected during
15   the assessment period, and then uploaded to a server for
data consolidation and archiving; (b) embedded in a
software product where the code is written in a general-
purpose programming language, such as Java, and would run
on a server accessed through a network for all functions;
20   and (c) as an application intended to be executed in a web
browser, such as a Java applet or an application produced
using FLASH, which is a product of Macromedia, Inc.

Next, **Figure 5** is an annotated class diagram of a
consulting assessment environment tool kit in accordance
25   with a preferred embodiment of the present invention. One
of ordinary skill in the art will appreciate that the
term "class" is used here in a general sense and that the
"classes" described in **Figure 5** need not be classes in an
object-oriented programming language, but may represent
30   any data or program code element in a data processing

system. The class diagram provided in **Figure 5** is presented to describe interrelationships between items of data and/or program code in a preferred embodiment of the present invention and should not be interpreted as
5   implying that a particular architecture or implementation language is required in order to practice the present invention.

Turning now to **Figure 5,** a consultant **500** uses an editing facility **502** to edit templates in consulting
10   assessment environment **506**, represented by template editing interface **504**. In a preferred embodiment of the invention in which consulting assessment environment 506 takes the form of a MICROSOFT EXCEL spreadsheet workbook, editing facility **502** is provided by the MICROSOFT EXCEL
15   program itself, through its graphical user interface (GUI). Other development tools may also be used for editing facility **502**.

Client **505** uses client user interface and engine **507** to access consulting assessment environment **506** for the
20   purpose of performing on-demand data acquisition and business assessment, represented by on-demand data acquisition and assessment interface **508**. In a preferred embodiment of the invention in which consulting assessment environment **506** takes the form of a MICROSOFT
25   EXCEL spreadsheet workbook, client user interface and engine **507** is provided by the MICROSOFT EXCEL program itself, as MICROSOFT EXCEL provides both a graphical user interface and a calculation/evaluation facility, which may function as the "engine" or "inference engine" with
30   which the business domain knowledge (which is encoded in

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the form of formulas in selected templates in the
workbook) is applied to acquired information about the
business (which is contained in data cells in selected
questionnaires or other data input templates in the
5   workbook).

     Consulting assessment environment **506** contains one
or more templates, as represented by template class **510**.
In a preferred embodiment of the invention in which
consulting assessment environment **506** takes the form of a
10   MICROSOFT EXCEL spreadsheet workbook, each template is a
separate worksheet or page within the workbook. Each
template has a "hidden" attribute **512,** which represents
whether that template is to be made inaccessible to
client **505** or other clients. This allows consulting
15   assessment environment to be provided to the client as a
deliverable product for the client's use, while still
protecting sensitive proprietary information from being
appropriated by the client or by others. For example,
proprietary logic rules and formulas may be encoded in a
20   hidden template, while input forms and reports are
allowed to be accessed by the client. Thus, the client
can view the input and output of an assessment, while the
proprietary formulas used to derive the output from the
input are hidden from view. One of ordinary skill in the
25   art will recognize that this "hidden" attribute may also
be employed in other non-spreadsheet-based embodiments of
the invention, such as in a database application, expert
system, or other application framework in which
consulting assessment environment is implemented.

Template class **510** is a generalization of a number of different template classes in this preferred embodiment. One of ordinary skill in the art will recognize that an even greater variety of types or

5 classes of templates may be employed in an actual embodiment without departing from the scope and spirit of the present invention. A data template or questionnaire (data template class **516**) contains forms or data entry specifications, such as assessment questions, desired

10 state descriptions, weight factors, benefit and risk descriptions.

Assessment framework class **518** denotes one or more templates that contain information regarding how to process input from a data template and achieve assessment

15 metrics or other results. An assessment framework template may contain formulas **520**, logic rules **522**, and risk and benefit definitions **524** to be evaluated in order to map input from a data template into a set of assessment scores. For example, formulas might be

20 defined so as to estimate the net present value (NPV) or internal rate of return (IRR) of various business activities in order to determine whether those business activities are profitable enough to continue in operation. Assessment scores may include numerical facts

25 such as NPV or IRR, numerical or other number-like assessment scores (e.g., a Red-Orange-Yellow-Green or other color-based scoring), Boolean-valued determinations (e.g., "Division X of the company is mismanaged."), and the like.

In particular, assessment framework templates may be programmed to compare business information or assessment scores with best practices or other business goals to determine whether any gap exists between the current

5   state of the business and a desired business state. This is known as "gap analysis." The existence of such a gap itself can also be considered as a type of assessment score. One of ordinary skill in the art will recognize that other forms of business domain knowledge, including

10   that derived from personal experience and/or expertise of consultants may be encoded into assessment framework templates in the form of formulas, logic rules, and other template constructs.

Suggested actions template class **526** denotes a class

15   of templates that contain actions to be suggested in response to particular assessment outcomes, such as gaps identified in gap analysis. A suggested action might be to sell off or close a particular business division that does not meet a desired level of profitability, for

20   example. Consolidation template class **528** denotes a class of templates that contain information regarding the structure of a business, so that assessment results for sub-divisions of a business may be consolidated into results that are relative to a larger division or to the

25   business as a whole. Report template class **530** represents a class of templates specifying the content and format of reports to be generated from assessment results, such as charts (chart class **534**) and text-based summaries (text summary class **536**).

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Figur 6 is a block diagram of a consulting assessment environment tool kit in accordance with an alternative embodiment of the present invention employing databases. Consulting assessment environment tool kit **600**

5   automates the beginning data gathering activities and provides a self-service interview process that users can complete at their convenience, thus automating what is a time-consuming process for consultants. Consulting assessment environment tool kit **600** performs data analysis

10   on the data that the user inputs in real time. Data synthesis is performed to relate the current state of the business to a desired state using an array or table structure to map data point relationships. Each user input from the self-service interview process provides a

15   data point. Each data point has attributes that relate to particular criteria for determining the gaps between the current state and desired state of a business.

Consulting assessment environment tool kit **600** includes four interlinked components; these components are

20   data templates component **605**, assessment framework component **610**, consolidation template component **615**, and report templates component **620**.

Data templates component **605** contains the content for label information, desired states or targets,

25   interview questions, weighing factors, benefits and risks (exposures) descriptions and weight factors, suggested actions, costing areas, and terminology. Information for data templates component **605** is stored in a database, such as data templates database **625**.

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  Assessment framework component **610** contains the calculation and logic for identification and general information gathering; gap calculations, scoring, analysis and reports, such as gap reports **630**; benefit

5 and risk mapping, scoring, analysis, and reports, such as benefits and risks reports **635**; suggested actions mapping, scoring, analysis, and reports, such as suggested actions reports **640**; and user input and feedback. Information for assessment framework component

10 **610** is stored in a database, such as assessment framework database **645**. Several repeatable business patterns are automated to allow consulting assessment environment tool kit **600** to analyze input from a user to produce assessment results in real time. The mapping of the data points from

15 the user input provides traceability for the results. Every result can be traced to a question or set of questions in the self-service interview process.

  Consolidation templates component **615** contains calculations and logic for consolidating individual

20 assessment results, and produces summary and distribution reports, such as summary reports **650** and distribution reports **655**. Summary reports for business process assessments may be produced at various levels, such as at a business unit level, a business function level, and a

25 business area level. Information for consolidation templates component **615** is stored in a database, such as consolidation templates database **660**.

  Report templates component **620** defines the charts and graphs for the reports. Office productivity

30 products, such as for example, MICROSOFT OFFICE, LOTUS

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SMARTSUITE, or web services may use report templates **620**. Information for report templates component **620** is stored in a database, such as report templates database **665**.

In the embodiment described in **Figure 6**, consulting
5   assessment environment tool kit **600** may be implemented as software application in a computer language or development framework that support access to database management systems. For example, consulting assessment environment tool kit **600** may be implemented as a program
10 in the JAVA programming language using the JAVA Database Connectivity (JDBC) interface to access template and assessment databases in a relational or object-relational database management system.

It is important to note that while the present
15 invention has been described in the context of a fully functioning data processing system, those of ordinary skill in the art will appreciate that the processes of the present invention are capable of being distributed in the form of a computer readable medium of instructions
20 and a variety of forms and that the present invention applies equally regardless of the particular type of signal bearing media actually used to carry out the distribution. Examples of computer readable media include recordable-type media, such as a floppy disk, a
25 hard disk drive, a RAM, CD-ROMs, DVD-ROMs, and transmission-type media, such as digital and analog communications links, wired or wireless communications links using transmission forms, such as, for example, radio frequency and light wave transmissions. The
30 computer readable media may take the form of coded

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formats that are decoded for actual use in a particular
data processing system.

The description of the present invention has been
presented for purposes of illustration and description,
5 and is not intended to be exhaustive or limited to the
invention in the form disclosed. Many modifications and
variations will be apparent to those of ordinary skill in
the art. The embodiment was chosen and described in
order to best explain the principles of the invention,
10 the practical application, and to enable others of
ordinary skill in the art to understand the invention for
various embodiments with various modifications as are
suited to the particular use contemplated.